THE BROWNING HEAVY MACHINE GUN

Mechanism Made Easy

·300 calibre model 1917

(WATER COOLED)

A L D E R S H O T

GALE & POLDEN LIMITED

One Shilling and Sixpence (net)

(By Post, 1/8)

The Browning Heavy Machine Gun Mechanism Made Easy

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Printed in Great Britain by
Gale & Polden Ltd., Aldershot
1942

P9673

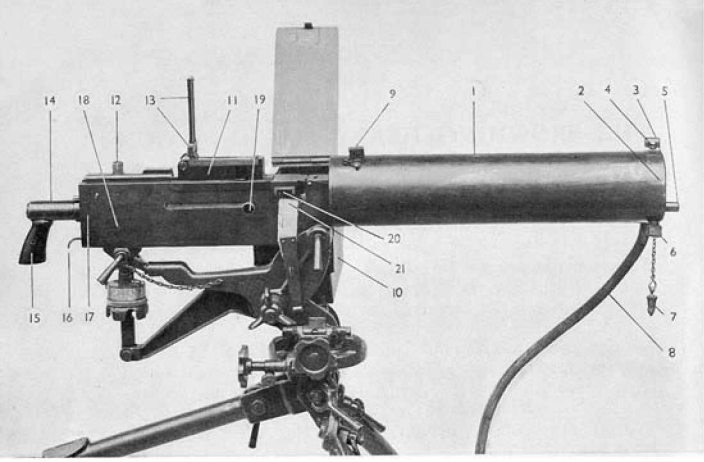


PLATE I

1 Water jacket.
2 Water jacket end cap.
3 Foresight protector.
4 Foresight.
5 Barrel (muzzle end protruding through muzzle gland).
6 Drain plug.
7 Cork plug stem and chain.
8 Steam hose affixed to steam vent.
9 Filler plug.
10 Ammunition box.
11 Cover.
12 Cover latch.
13 Rearsight.
14 Shock absorber mechanism.
15 Pistol grip.
16 Trigger.
17 Receiver.
18 Trigger pin recess hole.
19 Bolt handle.
20 Feedway.
21 Ammunition belt.

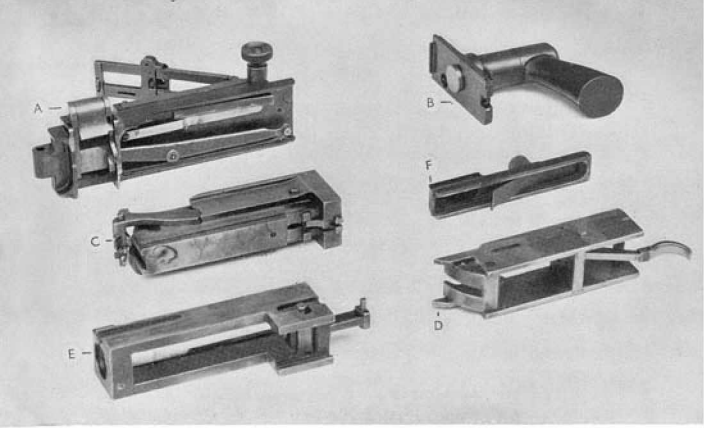


PLATE 2 *Illustrations of Assembled Groups*

(A) Cover group.
(B) Shock absorber group.
(C) Bolt group.
(D) Lock frame group.
(E) Barrel extension group.
(F) Cover latch.

FIELD STRIPPING

This should be done in the following sequence :

(1) Draw back cover latch, raise cover.
(2) Pull back bolt handle to the rearmost position, hold in this position by placing left wrist firmly on top of receiver and holding bolt handle with fingers of the left hand. Insert rim of cartridge or screw-driver into the slit of the driving spring rod, which will be found protruding from rear of back plate. Push driving rod in as far as it will go, rotate in clockwise direction until slit is vertical ; this locks the driving rod and retains driving spring fully compressed in bolt.

(3) Push bolt handle forward a few inches.

(4) Push cover latch forward with left hand. Back plate of pistol grip may now be lifted up and out of receiver with right hand.

(5) Pull bolt handle to rearmost position and withdraw bolt handle from bolt.

(6) Grasp driving spring rod with right hand, withdraw bolt and support same with left hand. Turn extractor upwards and remove.

(7) With nose of bullet, push in trigger pin (located in hole on the right side of receiver). Grasp lock frame spacer with left thumb and pull rearwards until lower projection of barrel extension drops down behind bottom plate of receiver.

(8) Grasp lock frame and push forward on tips of accelerator ; this will separate lock frame from barrel extension.

(9) Draw barrel extension and barrel to rear out of receiver.

(10) Unscrew barrel extension from barrel.

NOTE : *The above stripping* 1-10 *is what is normally needed under field conditions for a temporary stoppage necessitating a change of parts, etc.* (*see pp.* 29-30, *Stoppages*).

DETAIL STRIPPING OF GROUPS

(PLATES 3, 4, 5, 6, 7)

COVER

(1) With point of bullet turn cover pin spring upwards, withdraw pin, remove cover.

(2) With point of bullet turn feed lever pivot pin spring outwards, remove pivot pin, remove feed lever, remove belt feed slide.

(3) Push out feed pawl pin. Remove feed pawl and feed pawl spring.

(4) With point of bullet inserted between extractor cam and extractor spring, prise extractor spring away from extractor cam, remove extractor spring.

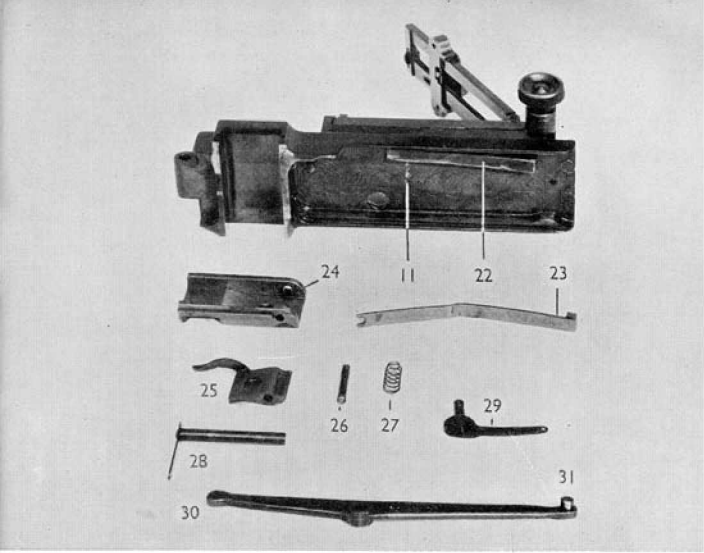


PLATE 3

Cover Group Stripped

11 Cover.
22 Cover extractor cam.
23 Cover extractor spring.
24 Belt feed slide.
25 Belt feed pawl.
26 Belt feed pawl pin.
27 Belt feed pawl spring.
28 Cover pin and spring.
29 Belt feed lever pivot pin and spring.
30 Belt feed lever.
31 Belt feed lever actuating stud.

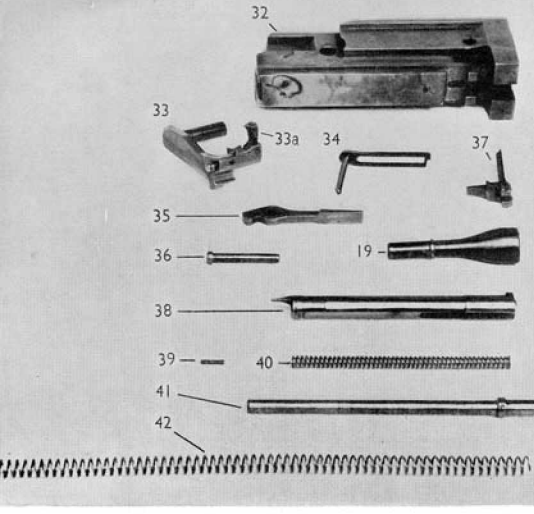


PLATE 4 *Bolt Group Stripped*

19 Bolt handle.
32 Bolt.
33 Extractor.
33*a* Ejector.
34 Sear spring and pin.
35 Cocking lever.
36 Cocking lever pin.
37 Sear.
38 Striker.
39 Striker spring retaining pin.
40 Striker spring.
41 Driving spring rod.
42 Driving spring.

SHOCK ABSORBER GROUP

(Stripping of this group is rarely needed except in case of repair)

(1) Unscrew adjusting screw.

(2) Remove adjusting screw plunger and the adjusting screw plunger spring.

(3) Remove buffer discs (there are 16 of these), buffer plug, buffer ring and buffer plate.

BOLT

(1) Remove extractor.

(2) With cocking lever in rearmost position insert point of bullet into trigger notch of sear. Press sear downwards, releasing striker.

(3) Push out cocking lever pin.

(4) Remove cocking lever.

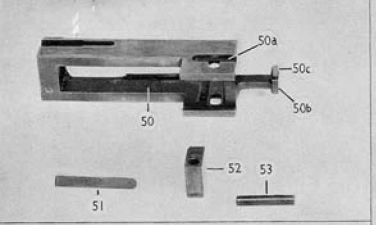
(5) With point of bullet push sear spring to left side of bolt.

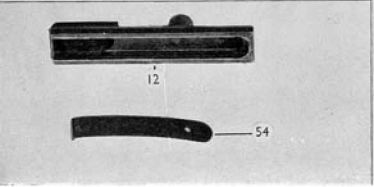
(6) Remove sear downwards. Replace sear spring in original position, sear spring and sear spring pin can now be removed upwards.

(7) Tilt bolt upwards and striker and spring assembly will fall out.

(8) To remove striker spring, push out striker spring retaining pin, taking care not to allow spring to fly out.

(9) Remove driving rod and driving spring by turning driving rod notch to horizontal position and withdrawing spring and rod under control. (The driving spring is long, and care should be taken not to kink it. A quick withdrawal of driving rod will prevent this.)





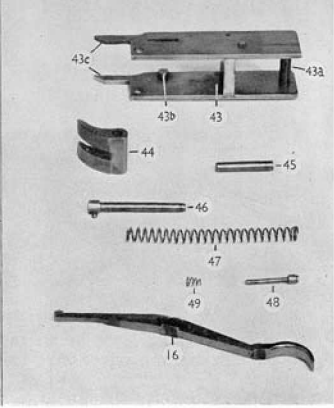


PLATE 6 (*above*)
Barrel Extension Group

50 Barrel extension.
50*a* Lock frame projection grooves.
50*b* T-lug extension.
50*c* Barrel plunger stud.
51 Barrel lock spring.
52 Breech lock.
53 Breech lock pin.

PLATE 7 (*below*)
Cover Latch

12 Cover latch.
54 Cover latch spring.

PLATE 5
Lock Frame Group

16 Trigger.
43 Lock frame.
43*a* Lock frame spacer.
43*b* Accelerator stop.
43*c* Lock frame projections.
44 Accelerator.
45 Accelerator pin.
46 Barrel plunger.
47 Barrel plunger spring.
48 Trigger pin.
49 Trigger pin spring.

LOCK FRAME

(1) Push out trigger pin and remove trigger pin spring.
(2) Remove trigger.
(3) Push out accelerator pin, remove accelerator.
(4) Push out barrel plunger head pin from slit in left side plate of lock frame. (Take care to keep spring under control whilst doing this.) Barrel plunger and barrel plunger spring may now be withdrawn.

BARREL EXTENSION

(1) Push out breech lock pin and remove breech lock.
(2) Insert nose of bullet under forward shoulder of barrel lock spring and prise it forwards and remove it.

COVER LATCH

Pull latch smartly to rear, removing it from its seat, remove cover latch spring.

TO REASSEMBLE GROUPS

Each group should be reassembled in detail in the reverse order in which it has been stripped.

HEAD SPACE ADJUSTMENT

This must be done before reassembly. By the term " head space " is meant the distance between the face of the bolt and the base of the barrel. When correctly adjusted the face of the bolt should firmly support the base of the cartridge in position in the chamber when the gun is fired.

TOO MUCH HEAD SPACE (*i.e., adjustment is too loose*)

The base of the cartridge will not be firmly supported by the bolt face and when cartridge is discharged a separated case or a bulged case may result, causing difficult extraction.

TOO LITTLE HEAD SPACE (*i.e., adjustment is too tight*)

(This can sometimes be detected by ear when the gun is being fired, as the bolt on its return to its forward position will give a dead sound effect.)

Binding of certain moving parts and slow rate of fire may result. It may not be possible for the mechanism to go fully home to the firing position, when the gun cannot be fired. Breakage of the barrel extension can result from firing the gun with head space too tight.

THE CORRECT HEAD SPACE ADJUSTMENT

(A) Partly screw barrel into barrel extension.

(B) Remove extractor from bolt. With barrel and barrel extension in a horizontal position, place the bolt in its full forward home position in the barrel extension.

(C) Lock bolt to barrel extension by lifting breech lock up into its seat; hold it firmly in this position.

(D) Continue screwing barrel into barrel extension until resistance is felt (other than that of the barrel lock spring).

(E) Release breech lock which should now fall of its own weight, if the head space adjustment is correct.

(F) Remove the bolt.

(G) Note position of barrel lock spring; if this is in between two barrel notches, screw barrel up to second notch. If barrel lock spring is seated in a barrel notch, screw barrel up to next notch.

It is advisable to mark barrel with this correct head space adjustment so that quick head space adjustment can always be made on subsequent stripping and reassembling.

REASSEMBLY OF GROUPS INTO GUN

Screw barrel into barrel extension. Insert the barrel and the barrel extension (head space adjustment having been made) into receiver from the rear. Slide the barrel forward carefully with the left hand until the lower projection of the barrel extension butts against bottom plate of receiver. Grasp lock frame and place accelerator claws between rear face of barrel extension and forward faces of T lug extension, inserting at the same time the forward projections of the lock frame into their corresponding grooves in the barrel extension. Push forward on the lock frame, which will tip back accelerator claws and will compress barrel plunger spring, thus locking lock frame to barrel extension. (During this operation the trigger bar must pass between the two accelerator claws, otherwise it will interfere with the

accelerator tips and prevent them proceeding rearwards.) Ensure the lock frame is securely locked to the barrel extension ; raise and push forward into the receiver the assembled barrel, barrel extension and lock frame ; push in trigger pin, when the whole assembly can be pushed fully forward home, making sure of this by seeing trigger pin reseats itself in its recess in the right side of receiver. Test that everything is home by pulling on the lock frame spacer rearwards. Insert bolt, making sure extractor is in position, and that cocking lever is in fully forward position.

Insert bolt handle. Push forward cover latch, replace pistol grip and back plate. Pull cover latch to rear, locking back plate in position. Pull bolt handle to rearmost position and, with it so held, insert screw-driver or base of bullet into slit of driving rod, push in and turn anti-clockwise to horizontal position, thus releasing driving spring. Allow bolt to return to forward position.

FINAL TEST OF HEAD SPACE ADJUSTMENT

Finally, test that the head space adjustment is correct as follows :—

Raise cover.

Raise extractor.

With mechanism in its fully forward position, take hold of bolt handle and withdraw it to rear $\frac{1}{4}$ inch ; there should be no independent movement of bolt rearwards from base of barrel—*i.e.*, barrel and bolt should move together to the rear.

If there is any such movement of bolt independent of barrel, head space adjustment is too loose.

To rectify, insert combination tool or point of bullet between right side of receiver and barrel notches, and screw up barrel one notch.

To test for too tight head space adjustment, work cocking mechanism backwards and forwards by means of bolt handle. If head space is too tight moving parts will not work smoothly ; the breech will bind as it is locked. The mechanism may not go fully home, when the trigger cannot be pulled to release striker.

To rectify too tight head space adjustment, insert combination tool or point of bullet between left side of receiver and barrel notches and unscrew barrel one notch.

Any such head space adjustment carried out must be tested.

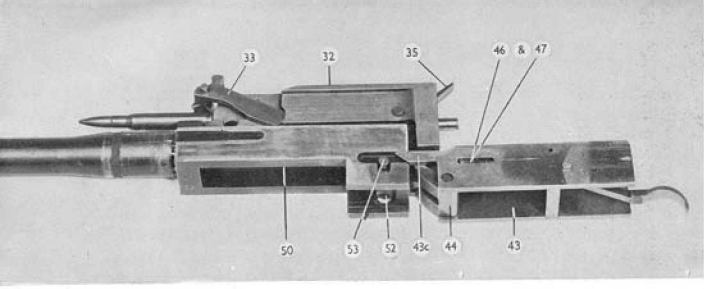


PLATE 8 *Internal Mechanism in Forward Position*

Bolt (32) forward in firing position.
Extractor (33) gripping succeeding round (in belt, not shown).
Cocking lever (35) in rearmost position.
Breech lock (52) forced up (by breech lock cam, not shown).
Breech lock pin projections (53) clear of lock frame projections (43*c*).
Accelerator claws (44) tipped forward.
Barrel plunger and spring (46 and 47) released, having pushed home on barrel plunger stud on T-lug of barrel extension.

BACKWARD MOVEMENT OF MECHANISM

BARREL
BARREL EXTENSION
BOLT
ACCELERATOR MOVEMENTS

When a cartridge is fired, the force of the explosion drives the bolt (which is locked to the barrel by the breech lock in the barrel extension), barrel and barrel extension to the rear approximately $\frac{5}{8}$ inch, when the breech lock clears the breech lock cam situated on the bottom plate of the receiver. The breech lock is now free to drop, and is assisted by the projections of the breech lock pin striking the inclined forward surfaces of the lock frame projections. The bolt is thus free to continue to the rear. The rear of the barrel extension strikes the forward curved surfaces of the accelerator claws, tipping them backwards until the accelerator abuts the accelerator stop ; the accelerator locks in this position, locking at the same time the barrel plunger and spring which have meanwhile been compressed by the rearward motion of the barrel plunger stud. The barrel and barrel extension are thus locked in this position, and cannot continue further to the rear. During the tipping backwards of the accelerator claws above described, the accelerator tips are in

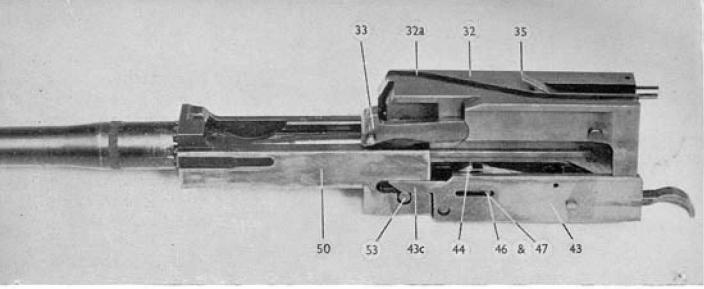


PLATE 9 *Internal Mechanism in Backward Position*

(32*a*) Feed lever actuating stud cam groove.
(33) Extractor in position to guide grooved rim of cartridge into T cut of bolt.
Barrel extension (50) stopped from proceeding rearward by lock frame (43).
The inclined faces of the lock frame projections (43*c*) have struck the projections of the breech lock pin (53), forcing them down and unlocking bolt.
Accelerator claws (44) have been tipped backward and the barrel plunger (46) driven rearward, compressing barrel plunger spring (47).
Cocking lever (35) has been forced forward, thus cocking striker.

contact with the forward faces of the bottom extensions of the bolt. The accelerator acting as an increasing lever assists and accelerates the bolt to the rear. During the rearward movement of the bolt, the tip of the cocking lever located in its socket in the top plate of receiver is forced forward, thus withdrawing striker to rear, compressing striker pin spring and engaging bent with sear.

During the above rearward movements of the mechanism the driving spring is compressed. Any remaining rearward motion of the bolt which has not been overcome in compressing the driving spring is absorbed by the buffer recoil mechanism.

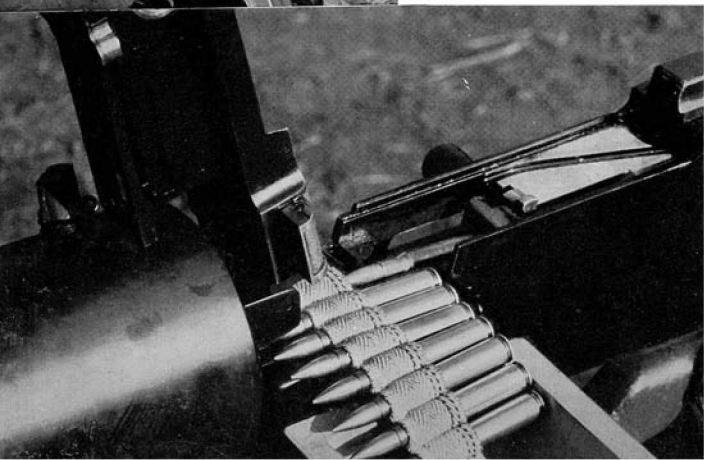
EXTRACTOR

FEEDING OF SUCCEEDING ROUND

During the backward movement of the mechanism, the extractor withdraws the succeeding cartridge from the belt; as the extractor reaches its rearmost position it is forced down by the extractor cam in the cover, ready to position the succeeding round in the T cut of the bolt head.

TOP ILLUSTRATION : *Shows bolt in fully forward position. Cover raised to show the belt feed arm actuating stud, having been driven to the left when located in cam groove of bolt. Thus the forward end of the belt feed arm has driven belt feed pawl to right, thus positioning succeeding round against cartridge stops in feed way. The extractor is gripping succeeding round.*

BOTTOM ILLUSTRATION : *Shows bolt proceeding rearwards, and the extractor withdrawing the succeeding round from the belt.*



FEEDING OF BELT
FEED LEVER
BELT STOP PAWL OPERATIONS

During the backward movement of the mechanism, the feed lever actuating stud is located in the cam groove in the top of the bolt; thereby its forward end engaged in the belt feed slide is driven to the left. The belt feed pawl is permitted by its spring to ride up and over the next cartridge. The belt is prevented from being carried in the same direction by the belt stop pawl.

The backward movement of the mechanism has thus achieved the following :—

(A) The spent case of the fired round has been extracted from the chamber.
(B) The succeeding round has been extracted from the feed belt ready to be positioned into the T cut of the bolt head for feeding into the chamber.
(C) The striker has been cocked.
(D) The feed mechanism is in position ready to feed another round into the feedway.
(E) The recoiling springs have been compressed ready to reassert themselves to drive mechanism forward again.

THE FORWARD MOVEMENT OF THE MECHANISM

The forward movement of the mechanism (described in detail below) provides the following :—

(A) The succeeding round is positioned into the T cut of the bolt and is fed into the chamber.
(B) The ejector ejects the spent case.
(C) The bolt closes and the breech is locked.
(D) The trigger bar engages the sear slot ready to release striker on trigger being pulled.
(E) The next cartridge in belt is fed into position in the feedway, and is gripped by the extractor, ready to be withdrawn from belt on the next rearward movement of the mechanism.

BOLT
ACCELERATOR
BARREL EXTENSION
BARREL

The compressed driving spring reasserts itself, driving the bolt forward. The succeeding round is positioned by the extractor into the T cut of the bolt head and is carried forward into chamber.

The bottom projections of the bolt strike the tips of the accelerator claws, tipping them forward and unlocking the barrel plunger ; the barrel plunger spring reasserts itself, driving forward the barrel extension and barrel. The breech lock rides up the breech lock cam to lock bolt to barrel extension and barrel. The sear notches engage the trigger bar. The tip of the cocking lever is returned to its fully backward position. (It should be noted that, should the mechanism not go fully forward home, the cocking lever will not be right back, thus preventing the striker from striking the cap of the cartridge.)

BELT FEED
FEED LEVER
FEED PAWL
CARTRIDGE STOPS

The feed lever actuating stud riding in its cam groove in the bolt is driven to the left, thus its forward end carries the feed slide to the right, carrying with it the belt feed pawl, belt, and succeeding round until the latter abutts the front and back cartridge stops in the feedway. The succeeding round is now in position for the extractor to extract it.

EXTRACTOR

During the first part of the bolt's travel forward the extractor feed cam, situated on the left plate of receiver, strikes the extractor plunger and guides the extractor downwards, finally positioning the base of the succeeding round in T cut of bolt, and nose of bullet into chamber.

The ejector (at the bottom of the extractor) strikes the spent case (if it has not already fallen out), which has been withdrawn from the chamber (the rim of spent case being in T cut of bolt head), and ejects the spent case through the ejector port opening in the base of the receiver.

When the bolt has nearly closed, the extractor is forced up by a steeply inclined cam on the left plate of receiver, thus releasing its grip of the cartridge, which has been fed well into the chamber. The extractor rides upwards and over the base of the next cartridge in the belt in the feedway. The extractor spring in the cover forces the extractor down and on to this cartridge, thus gripping it securely ready to withdraw it on the next rearward movement of the mechanism.

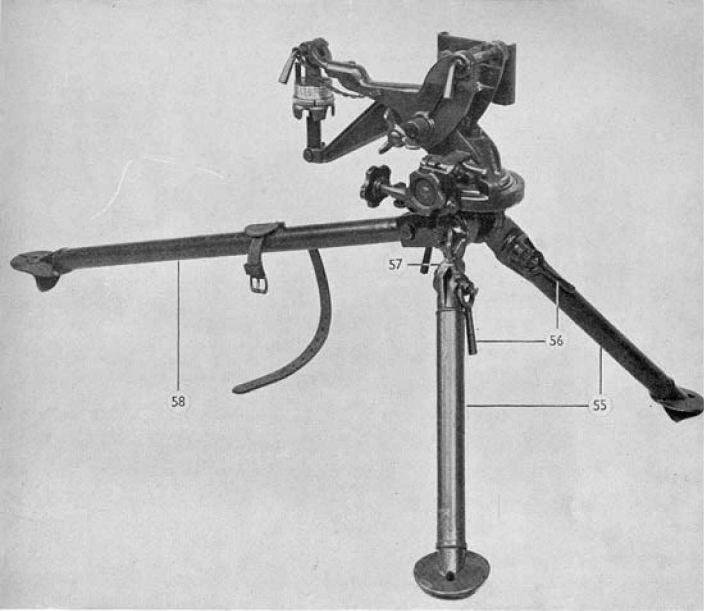


PLATE IO *Tripod Mounting, Model* 1918

55 Front legs.
56 Front leg jamming handles.
57 Trail leg jamming handles.
58 Trail leg.

THE TRIPOD MOUNTING (MODEL 1918)

The illustration above clearly shows the various parts.

To mount gun, turn elevating and trunnion pin handles to vertical position and withdraw. Place gun on tripod so that its mounting holes coincide with the trunnion bracket holes and elevating bracket holes. Push in trunnion pin, and turn trunnion pin to lock; reinsert elevating pin and turn to lock.

Loosen pintle lock handle, and adjust traversing dial to a horizontal position. Tighten pintle lock handle, making certain the teeth on the locking plunger are in firm engagement with the toothed sector. Place ammunition box in bracket situated on left side of tripod.

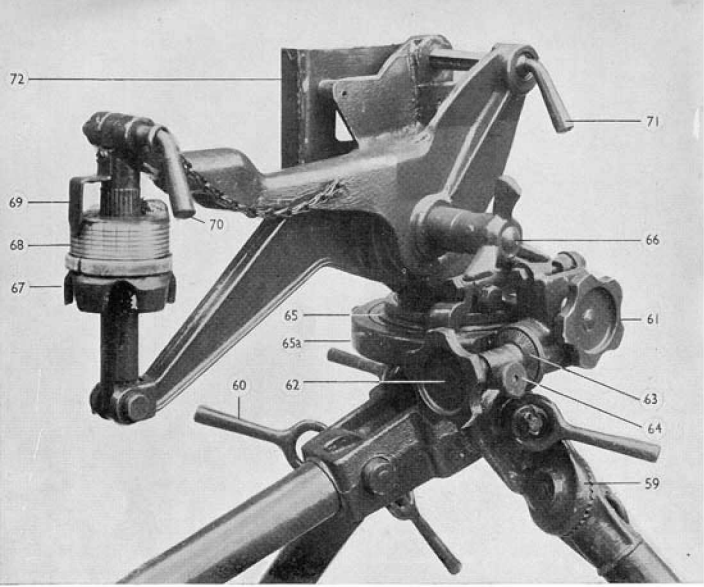


PLATE II *Tripod Head, Model* 1918

59 Front leg clutch plates.
60 Pintle locking handle.
61 Traversing mechanism clamp.
62 Slow-motion traversing wheel.
63 Slow-motion traversing dial.
64 Slow-motion traversing dial zero adjustment lock nut.
65 Traversing dial.
65*a* Pintle.
66 Elevating clamp.
67 Slow-motion elevating hand wheel.
68 Slow-motion elevation dial.
69 Slow-motion elevation dial pointer.
70 Elevating pin.
71 Trunnion pin.
72 Ammunition box bracket.

ELEVATING MECHANISM

A slow-motion elevating hand wheel is provided with a mil clicking device. Turned in a forward direction (*i.e.*, forwards away from gunner) raises gun, and turned in the reverse direction lowers gun. Each click represents 1 mil alteration.

Larger alteration in angles of elevation than that provided by the slow-motion elevating hand wheel may be accomplished by loosening elevating clamp and raising or lowering gun.

TRAVERSING MECHANISM

A slow-motion mil clicking traversing gear is provided. With the traversing gear clamp screwed up so that the teeth of the traversing gear are engaged, the traversing handle when rotated in a clockwise direction traverses gun to left, and when rotated in an anti-clockwise direction traverses gun to right. Each click represents 1 mil traverse.

With the traversing gear clamp unscrewed so that the traversing gear teeth are disengaged, the gun is free to be traversed by hand.

Small angles of traverse can be read off from the small dial on the traversing hand wheel. Zero setting can be established by loosening dial lock nut and tightening at desired setting.

Larger alterations in angles of traverse than that provided by the slow-motion traversing wheel may be accomplished by loosening traversing clamp and traversing gun by hand. Angles of traverse may be read off from traversing dial which is provided with an adjustable zero setting that can be turned by hand.

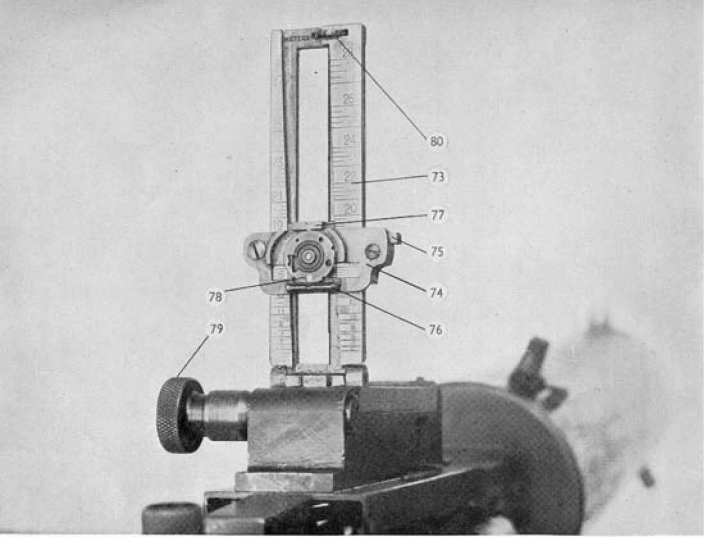


PLATE 12 *Backsight*

73 Graduated leaf.
74 Adjustable backsight slide.
75 Adjustable backsight slide catch.
76 Fixed open backsight.
77 Adjustable open backsight.
78 Six-hole adjustable aperture eye-piece.
79 Windage adjustment screw.
80 Elevating fine adjustment screw.

SIGHTS

FORESIGHT

A blade foresight is fitted at the top of end cap of water jacket, being dovetailed into the sight block, and is thereby adjustable laterally. It is provided with a tubular foresight protector.

BACKSIGHT

In Plate 12 is illustrated the backsight described in detail below. It is to be noted that guns may be fitted with different types of backsights to the one described. The description that follows should enable other types of backsights to be easily understood and used. It consists of a leaf. In its lowered position an open U backsight is in position, which is sighted for 500 metres. When leaf is raised graduations on the leaf are used by which the slide is set to the range required. For large variations in elevation the catch on the right side of the slide is depressed and the slide raised or lowered to range selected. For small and fine adjustments of elevation the elevating notched wheel at the top of the slide is used. The slide carries an adjustable plate containing five different sized apertures so as to enable the gunner to select the one most suitable to the shooting conditions.

To set for the aperture required, push in with the tip of a finger on the serrated circle on the aperture plate and turn until the aperture required is at the bottom. Make sure aperture plate is correctly fixed by seeing that the corresponding notch on the periphery of the sight plate is engaged with the key at the top of the slide.

The aperture is set to the range marked on the leaf that coincides with the bottom face of the window (*e.g.*, illustration shows aperture sight set for 1,500 metres). In addition to the aperture there is an open U backsight at the top of the slide. This open sight is set to the range marked on the leaf that coincides with the top edges of the shoulders of this sight (*e.g.*, illustration shows open adjustable backsight set for 1,950 metres). It will be noticed from the illustration that the grooves in the leaf in which the slide moves up and down incline to the left, so that as the slide is raised the aperture is automatically moved to the left. This movement is made to counteract the drift of the bullet.

The leaf sight is mounted on a base which is adjustable for windage ; this adjustment is accomplished by means of the milled-headed screw situated to the left of the sight base. This windage adjustment screw, when rotated backwards towards gunner, moves sight to left to counteract for wind blowing from left to right, and when rotated forward (*i.e.*, away from gunner) the sight is moved to the right to counteract wind blowing from the right.

PLATE 13 *The Firing Position* (*Gun mounted on* 1918 *Tripod*)

BEFORE FIRING

PREREQUISITES

(1) Ammunition loaded into belts.
(2) Ammunition boxes.
(3) Water condenser filled with water.
(4) Combination tool.
(5) Cleaning rod.
(6) Separated case extractor.
(7) Spare parts.

NOTE : 4, 5, 6 *and* 7 *are essential for possible stoppages.*

(A) All mechanism must be clean, free from dust, dirt and fluff, and thoroughly oiled.

(B) When assembled, rear barrel packing should provide a smooth watertight fit in trunnion block; copious oiling or greasing remedies slight water leak here.

(C) Muzzle gland should provide a smooth water-tight fit with barrel. The barrel should be well oiled or greased where it slides through muzzle gland.

(D) Test head space adjustment.

(E) Fill waterjacket.

NOTE : Correct carrying out of (B) and (C) should be tested by operating mechanism with bolt handle. The mechanism should work smoothly ; no undue force should be required to withdraw barrel and mechanism to the rear, and with the bolt handle released from its rearmost position mechanism should return to its fully forward position and the bolt should lock properly home against base of cartridge in chamber.

(F) Attach steam hose to steam vent in water jacket, with its free end inserted into water condenser.

(G) Check ammunition belts ; they should be clean, dry and uniformly and correctly loaded.

(H) Tripod must be firmly seated on ground, spade feet of legs stamped in, all jamming handles tight.

FIRING POSITION

The firing position described below is shown in Frontispiece and Plate 13.

Place two ammunition boxes on their sides, one on either side of the trail leg, to form a seat for gunner.

Gunner should be seated on the ammunition boxes with one leg on either side of trail leg of tripod, knees drawn up in a comfortable position of rest so that gun may be freely traversed in either direction. Left hand should grasp the pistol grip, index finger round trigger. Right hand on traversing or elevating wheel. The tripod should be so adjusted that the gunner's line of sight is along the sight base of gun, gunner sitting naturally without any straining of the head.

In the absence of two ammunition boxes to form a seat for gunner, an alternative position can be taken up. The gunner is seated on ground to right of trail leg. This is quite a satisfactory firing position providing extreme angles of traverse to the left are not required, in which event it is best for gunner to so position gun on tripod so that he is seated in a line with gun midway between maximum anticipated traversing angles right or left that may be required.

FIRING

Set sights to range required.

Release elevating and traversing mechanism clamps ; align sights on target.

See that elevating hand wheel and traversing dial and slow-motion traversing dials are at zero.

Tighten elevating and traversing clamps.

Check alignment of sights on target by elevating wheel and slow-motion traversing wheel.

Insert loaded ammunition belt in feedway, ammunition box having been placed in its bracket on tripod (illustration page 18).

Cock gun by withdrawing bolt handle to rear and allowing it to fly forward. Repeat once.

Push safety catch to right ; this locks trigger at safe position.

TO FIRE

Release safety catch by pushing it to left, confirm aim, press trigger, and keep trigger pressed for required number of rounds desired to be fired in burst. Release trigger. Repeat for subsequent bursts of fire, relaying aim between bursts.

IMPORTANT : Gunner should allow gun to vibrate normally on tripod. No attempt should be made to hold the gun firmly with either hand to counteract vibration. No weight should be placed on tripod, either by gunner sitting on trail leg or by riding front tripod legs with his feet.

DURING FIRING

Gun should be watched for water leaks, sluggish action, and excessive vibration on tripod.

Slight water leaks may be remedied as previously described in paras (B) and (C) pp. 26-27. Serious water leaks will necessitate adjustment of packing glands.

If sluggish action is apparent, the following remedies should be tried, and the gun fired as each is carried out until sluggishness is remedied :—

(1) Test head space adjustment.

(2) Oil muzzle gland.

(3) Clean chamber (if dirt, dust or grit particles are present, evidence of such will be given by longitudinal scratches on ejected cases).

(4) Oil mechanism plentifully.

(5) Tighten buffer recoil mechanism.

STOPPAGES REMEDIED BY IMMEDIATE ACTION

(1) GUN FAILS TO FIRE

Gunner takes hold of ammunition belt protruding to the right of gun from feedway and gives it a sharp jerk to the right.

Cock gun. Relay aim. Continue firing.

(2) GUN STILL FAILS TO FIRE

Gunner raises cover. Pull bolt handle to rear, meanwhile left hand is placed under ejection port at bottom of receiver to catch ejected round.

If a separated case is cause of stoppage, either a live round will be ejected with the front portion of a separated case adhering to it or the separated case will be left in the chamber. In this event, call for clearing plug (of the cartridge type) which is placed in feedway against the cartridge stops and gripped by the extractor, holding down on the extractor, load the clearing plug slowly and smoothly into the chamber so that it will not strike and so burr the edge of the chamber. Strike forward on the bolt handle to ensure that the clearing plug is seated in ruptured case. Pull bolt handle to rear when clearing plug and separated case will be ejected. The separated case should be removed from the clearing plug so that it is ready for further use.

Tighten head space adjustment one click.

Cock gun. Relay aim. Continue firing.

If live round is ejected, inspect cap ; if struck, reject round.

Continue firing.

If cap has not been struck by striker—

Replace bolt with spare completely assembled bolt.

Adjust head space.

Continue firing.

If no round is ejected—

Inspect chamber. If round in chamber—

Remove it by passing cleaning rod through barrel from muzzle end and pushing it out of chamber. (Too much force should not be exercised as base of round may be driven forcibly against T cut in bolt, thereby injuring T cut, or base of round may become jammed in T cut.)

If no round is ejected and there is no round in chamber—

Raise extractor and inspect for round in T cut of bolt. If there is a round in T cut and there is room to insert end of combination tool through bolt handle slot and beneath round, prise round upwards out of T cut. Otherwise tap round down through T cut until it drops through ejection port.

If no round is ejected, no round in chamber or in T cut—

Inspect first round; if a short round (*i.e.*, a round which has had the bullet pushed back into case) discard it and continue firing.

If the first round has a definite nick in the rim where the extractor has struck it, the belt feed lever should be replaced, as this indicates the belt feed lever actuating stud is worn.

If gun still fails to fire—

Raise cover.

Inspect feed mechanism, belt feed lever, belt feed and stop pawls, extractor cover spring and replace defective parts.

RUNAWAY GUN

If gun still continues to fire when trigger is released, raise cover immediately; this will stop feed mechanism from functioning. Remove belt. This fault is caused by the trigger bar being bent down at its forward end. To rectify remove trigger bar and bend front end upwards slightly.

ASSISTANT GUNNER

NOTE: During immediate action assistant gunner should carry out the following :—

Whenever cover is raised, remove first round from belt and hold ready for inspection; reposition belt in feedway.

Have handy all spare parts, cleaning rod, separated case extractor and combination tool.

Hand to gunner any spare part or tool called for by him.

Carry out any instructions gunner directs.

AFTER FIRING

Strip gun.

Clean barrel as for rifle. [Note the hot water in jacket can be used for cleaning bore of barrel as follows : Make a plug with a piece of flannelette round a cartridge case of a size to fit into muzzle gland tightly. Tilt muzzle towards ground. As gunner withdraws barrel, assistant gunner plugs muzzle gland. The barrel withdrawn from mechanism, can now be inserted, muzzle first, into and in front of muzzle gland (first withdrawing plug) and the hot water from jacket allowed to flow through barrel.]

Drain water jacket ; thoroughly grease outside of barrel as well as the bore.

Clean and oil thoroughly all parts.

It is advisable to remove driving spring and rod to clean and oil, as during damp weather there is a likelihood of these becoming rusty unseen in the bolt.

Examine mechanism for any wear or burred parts ; replace those necessary.

Reassemble gun.

Check spare parts and accessories.

Thoroughly clean tripod and oil working parts and threads.

USEFUL NOTES

A change of 1 mil adjustment on slow-motion elevating mechanism or slow-motion traversing mechanism alters strike of bullet approx. 3.5 inches per 100 yards of range. For practical purposes 1 mil may be taken to be equivalent to 3½ minutes. The fixed open sight (illustrated in Plate 12) which is in position with the rearsight leaf lowered is sighted to hit the point of aim at 500 metres.

For guns equipped with rearsight leaf graduated in metres the following table will be useful.

CONVERSION TABLE

METRES INTO YARDS				YARDS INTO METRES			
2,800 metres	=	3,080 yards		3,000 yards	=	2,700 metres	
2,500 ,,	=	2,750	,,	2,500 ,,	=	2,250	,,
2,000 ,,	=	2,200	,,	2,000 ,,	=	1,800	,,
1,500 ,,	=	1,650	,,	1,500 ,,	=	1,350	,,
1,000 ,,	=	1,100	,,	1,000 ,,	=	900	,,
750 ,,	=	825	,,	750 ,,	=	675	,,
500 ,,	=	550	,,	500 ,,	=	450	,,
250 ,,	=	275	,,	250 ,,	=	225	,,
200 ,,	=	220	,,	200 ,,	=	180	,,
150 ,,	=	165	,,	150 ,,	=	135	,,
100 ,,	=	110	,,	100 ,,	=	90	,,
50 ,,	=	55	,,	50 ,,	=	45	,,

CALIBRATION OF REARSIGHT LEAF

Originally the rearsight leaf was calibrated for .300 '06 ammunition and graduated up to 2,600 yards. Later issues were calibrated for .300 MI ammunition and were graduated up to 3,300 yards.

The trajectories of .300 '06 ammunition and .300 MI ammunition differ so slightly up to 800 yards that for practical purposes the sights graduated for '06 ammunition can be used up to 800 yards when firing MI ammunition. At greater ranges, however, the setting of these sights must be corrected to compensate for the different trajectory of the MI ammunition. The table below shows the correct setting.

Range in Yards	*Sights calibrated for '06 ammunition (i.e., sights graduated to 2,600 yards only) should be set to figures below when firing MI ammunition.*
700	725
800	825
900	950
1,000	1,075
1,200	1,300
1,400	1,575

CONSERVATION OF WATER

In action when parts of internal mechanism of gun break, a completely assembled group containing that part is exchanged for the group in gun containing the broken part, *e.g.*, if striker in bolt is faulty, a completely assembled bolt is exchanged for the one which is in the gun. This exchange of assembled groups often calls for the withdrawal of the barrel.

If there is time to drain the water jacket this is done by removing filler plug (to allow air to enter, thus accelerating flow of water) removing drain plug and allowing water to flow into water can.

If it is required to reduce time to a minimum at the same time, conservation of water being necessary, this may be effected by the following procedure.

Assistant gunner prepares a plug of a size that will effectively seal the muzzle gland. A suitable plug may be made with flannelette wrapped round an empty cartridge case or round steam cork plug. When gunner is ready for barrel to be withdrawn, he inclines muzzle of gun at a steep angle towards the ground. Assistant gunner places plug to butt against muzzle end of barrel, pushing plug into muzzle gland at same time pushing barrel to rear which is then withdrawn by gunner. (Note a rush of water should not be allowed to flow through muzzle gland at any time as this may disarrange packing, causing water leak here necessitating renewal, thus causing delay.)

When replacing barrel, plug muzzle with a piece of flannelette, insert barrel and push out plug in gland with muzzle. A patch should be run through bore on cleaning rod to ensure no water or obstruction has been left. During these operations assistant gunner should take care that hot water does not reach his hands as it may be quite hot enough to cause nasty scalds.

LOG BOOK

It is very important that a log book be kept for each gun, recording its details, number of rounds fired, etc. Details of such a book can be obtained from the publishers, Gale & Polden Ltd.